Activity: Investigating Solutes and Solvents

In this activity, you will work in groups of 4 to hypothesize whether a list of solutes will dissolve in mineral oil (non-polar) or water (polar). You will then design and perform an experiment with various solutes to test your hypothesis.

Pre-Lab Questions:

1. Draw a water molecule. Label your diagram to explain why water is a polar molecule.
2. Look up the structure of mineral oil. Explain why it is non-polar.
3. List the variables you need to control to keep your experiment fair.

Question:

Hypothesize about how the solubility of a solute in solvent differs depending on the nature of the solute and solvent.

Instructions:

1. Consider the solubility of the following 6 solutes: table salt, iodine, sugar, glycerol, paraffin wax and petroleum jelly in both water and mineral oil.
2. Create a table to record your predictions, justification of predictions, observations and explanation about why the solute behaved the way it did in the solute
3. Predict which solutes will dissolve in water and mineral oil. Justify your predictions and record in the table.
4. Write a procedure to test your predictions. Be sure to list your variables. Your procedure must be approved by your teacher prior to you testing your hypotheses.
5. Record your observations in the table.

Analysis:

1. List the substances that dissolved in water.
2. List the substances that dissolved in mineral oil.
3. List the substances that dissolved in both water and mineral oil.
4. Classify the solute as ionic, polar or non-polar. Justify your classification using the evidence you gathered from your tests.
5. Explain, what is happening on a molecular level for the solubility of all the solutes in both water and mineral oil. Be prepared to present your results in class using a format of your choosing.